OPTIMAL FREQUENCY SETTING FOR CIRCULAR BUS ROUTES IN URBAN AREAS

Mahmoud Owais, Ghada Moussa, Yousef Abbas, Mohamed El-Shabrawy

Abstract:

closed bus routes. Transit passengers, in many cases, deal with overlapping bus routes with some routes sharing common sections and stops. Passenger assignment problem is a major task in frequency setting of bus service which aims to minimize passengers and operator costs. In this work, mixed integer mathematical formulation based on passenger choice problem is developed to track each proportion of passengers in selecting bus routes for -0- and -1- trips transfer. The proposed model would help for a given transit network and total bus fleet size to minimize network total travel time. It would optimally distribute frequency among bus routes, regarding passengers interests in selecting bus routes. It differs from traditional models, since it helps in tracking different users while they are moving on the network. Numerical examples are given to clarify the proposed mathematical formulation. Circular bus routes operational performance is tested using Mandl's network benchmark problem. Genetic Algorithm has been implemented with Matlab language in solution procedure. Comparing results with previous work indicates that circular bus routes manage in minimizing average user travel time for the same operator cost. The results from this study would help in further work to optimize transit vehicle size and stops distances along each single bus route.

Keywords:

Circular bus routes - Frequency setting - Mixed Integer Programming - Genetic Algorithm

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Evaluation and analysis of urban passengers transport modes operation performance & efficiency

Owais M., Salah G., Enieb M. and Abbas Y.

Abstract:

While the demand for transportation is growing rapidly, many problems are facing planners and traffic operators in urban areas; such as; low performance and efficiency levels of passengers transport system. The strategy for tackling these problems has been for years to consider adding more capacity to the transport supply system, through huge investments in transport infrastructure. Best utilization of available transport services and facilities is an urgent necessity. Methods developed in the theory of optimization, through making use of advanced computation technology, would allow one to make experimental analysis and evaluation of different policies and strategies for better understanding of the transportation problem and to select a solution for efficient utilization of resources. This paper presents a methodology for transport modes operation analysis for different policies and strategies to be simulated in order to reach optimal goals. The performance and efficiency of transport modes operation are formulated in a framework as an output maximization process of an objective function, subject to state variables, decision variables, constraints and variable bounds. Four main traffic operation strategies which would have great impacts on urban transportation performance and efficiency were analyzed, each strategy contains heuristics of many trial values of decision variables. The overall methodology is seeking global optimality. The research output revealed two important indicators for alternative transport systems evaluation; Mode Efficiency Factor and transport system passenger supply Efficiency Index. The efficient transport system supply that satisfies a certain demand is attained. Moreover, an identification and clarification of most compatible transport modes, suitable for passenger demand sharing, that would give optimal performance indicators are documented.

Keywords:

Urban passengers; Transportation Modes; Optimization; Operation Performance; Operation Efficiency

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Multi-Objective Transit Route Network Design as Set Covering Problem

Mahmoud Owais, Mostafa K Osman, Ghada Moussa

Abstract:

Many past researchers have ignored the multi-objective nature of the transit route network design problem (TrNDP), recognizing user or operator cost as their sole objective. The main purpose of this study is to identify the inherent conflict among TrNDP objectives in the design process. The conventional scheme for transit route design is addressed. A route constructive genetic algorithm is proposed to produce a vast pool of candidate routes that reflect the objectives of design, and then, a set covering problem (SCP) is formulated for the selection stage. A heuristic algorithm based on a randomized priority search is implemented for the SCP to produce a set of nondominated solutions that achieve different tradeoffs among the identified objectives. The solution methodology has been tested using Mandl's benchmark network problem. The test results showed that the methodology developed in this research not only outperforms solutions previously identified in the literature in terms of strategic and tactical terms of design, but it is also able to produce Pareto (or near Pareto) optimal solutions. A real-scale network of Rivera was also tested to prove the proposed methodology's reliability for larger-scale transit networks. Although many efficient meta-heuristics have been presented so far for the TrNDP, the presented one may take the lead because it does not require any weight coefficient calibration to address the multi-objective nature of the problem.

Keywords:

Meta-heuristics multi-objective problem set covering problem transit route network design

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A Comprehensive Study of the Effect of Spatial Resolution and Color of Digital Images on Vehicle Classification

Khaled F. Hussain, Mahmoud Afifi, and Ghada Moussa

Abstract:

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Keywords:

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IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, NULL, NULL
Robust Deep Learning Architecture for Traffic Flow Estimation from a Subset of Link Sensors

Mahmoud Owais, Ghada Moussa, Khaled F. Hussain

Abstract:

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Keywords:

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Pre-trained deep learning for hot-mix asphalt dynamic modulus prediction with laboratory effort reduction.

Ghada Moussa, Mahmoud Owais

Abstract:

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Construction and Building Materials. , NULL , NULL
INVESTIGATING THE MOISTURE SUSCEPTIBILITY OF ASPHALT MIXTURES MODIFIED WITH HIGH-DENSITY POLYETHYLENE

Ghada Moussa, Ashraf Abdel-Raheem, Talaat Ali Abdel-Wahed

Abstract:

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An Optimal Metro Design for Transit Networks in Existing Square Cities Based on Non-Demand Criterion.

Mahmoud Owais, Abdou SH Ahmed, Ghada Moussa, Ahmed Abdelmoamen Khalil

Abstract:

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Integrating Underground Line Design with Existing Public Transportation Systems to Increase Transit Network Connectivity: Case Study in Greater Cairo

Mahmoud Owais, Abdou SH Ahmed, Ghada Moussa, Ahmed Abdelmoamen Khalil

Abstract:

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Design Scheme of Multiple-Subway Lines for Minimizing Passengers Transfers in Mega-Cities Transit Networks

Mahmoud Owais, Abdou SH Ahmed, Ghada Moussa Ahmed Abdelmoamen Khalil

Abstract:

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-Sensor Location Model for O/D Estimation: Multi-Criteria Meta Heuristics Approach

Mahmoud Owais, Ghada Moussa, Khaled F. Hussain

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A Comprehensive Study of the Effect of Spatial Resolution and Color of Digital Images on Vehicle Classification

Khaled F. Hussain, Mahmoud Afifi, Ghada Moussa

Abstract:

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ON-ROAD VEHICLE CLASSIFICATION BASED ON RANDOM NEURAL NETWORK AND BAG-OF-VISUAL WORDS

Khaled F. Hussain, Ghada Moussa

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